

CLAIMS

We claim:

1. A method for making a thin film transistor containing a gate dielectric structure, comprising:

providing a substrate for the gate dielectric structure; and

providing an oxide layer of the gate oxide structure on the substrate by an in-situ steam generation process.

2. The method of claim 1, wherein the substrate comprises a gate conductor on a glass substrate.

3. The method of claim 1, wherein the thin film transistor is a floating gate transistor or a SONOS transistor.

4. The method of claim 1, wherein the in-situ steam generation process flows hydrogen and oxygen over the substrate.

5. The method of claim 1, wherein the in-situ steam generation process is performed at a temperature ranging from about 600 to about 900 degrees Celsius.

6. The method of claim 1, wherein the in-situ steam generation process is performed at a pressure ranging from about 100 millitorr to about 760 torr.

7. The method of claim 1, wherein the in-situ steam generation process is performed for a time sufficient to deposit an oxide thickness of about 10 to about 200 angstroms.

8. The method of claim 1, further including annealing the oxide layer in a nitric oxide atmosphere.

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9. A method for making a semiconductor device, comprising:

providing a substrate;

providing a first oxide layer on the substrate by an in-situ steam generation process;

providing a nitride layer on the oxide layer; and

providing a second oxide layer on the nitride layer.

10. The method of claim 9, wherein the semiconductor devices is a SONOS transistor.

11. The method of claim 9, wherein the in-situ steam generation process flows hydrogen and oxygen over the substrate.

12. The method of claim 9, wherein the in-situ steam generation process is performed at a temperature ranging from about 750 to about 1050 degrees Celsius.

13. The method of claim 9, wherein the in-situ steam generation process is performed at a pressure ranging from about 100 millitorr to about 760 torr.

14. The method of claim 9, wherein the in-situ steam generation process is performed for a time sufficient to deposit an oxide thickness of about 10 to about 200 angstroms.

15. The method of claim 9, further including annealing the oxide layer in a nitric oxide atmosphere.

16. A method for making a gate dielectric structure for a thin film transistor or a SONOS device, comprising:

providing a substrate; and

providing an oxide layer of a gate dielectric structure on the substrate by an in-situ steam generation process.

17. The method of claim 16, wherein the in-situ steam generation process flows hydrogen and oxygen over the substrate.

18. The method of claim 16, wherein the in-situ steam generation process is performed at a pressure ranging from about 100 millitorr to about 760 torr and a temperature ranging from about 600 to about 1050 degrees Celsius.

19. The method of claim 16, wherein the in-situ steam generation process is performed for a time sufficient to deposit an oxide thickness ranging from about 10 to about 200 angstroms.

20. The method of claim 16, further including annealing the oxide layer in a nitric oxide atmosphere.

21. A method for making a gate dielectric structure for a thin film transistor or a SONOS device, comprising.

providing a substrate;

providing an oxide layer of a gate dielectric structure, the oxide layer having a thickness of about 10 to about 200 angstroms; and

annealing the oxide layer in a nitric oxide atmosphere.

22. A method for making a gate dielectric structure for a thin film transistor or a SONOS device, comprising.

providing a substrate;

providing an oxide layer of a gate dielectric structure on the substrate by an in-situ steam generation process performed at a temperature ranging from about 600 to about 1050 degrees

Celsius, a pressure ranging from about 100 millitorr to about 760 torr, and for a time sufficient to deposit an oxide thickness of about 10 to about 200 angstroms; and

annealing the oxide layer in a nitric oxide atmosphere.

23. A thin film transistor containing a gate dielectric structure made by the method comprising:

providing a substrate for a gate dielectric structure; and

providing an oxide layer of the gate dielectric structure on the substrate by an in-situ steam generation process.

24. A SONOS semiconductor device made by the method comprising:

providing a substrate;

providing a first oxide layer on the substrate by an in-situ steam generation process;

providing a nitride layer on the oxide layer; and

providing a second oxide layer on the nitride layer.

25. An integrated circuit containing a thin film transistor with a gate dielectric structure made by the method comprising:

providing a substrate for the gate dielectric structure; and

providing an oxide layer of the gate dielectric structure on the substrate by an in-situ steam generation process.

26. An integrated circuit containing a SONOS semiconductor device made by the method comprising:

providing a substrate;

providing a first oxide layer on the substrate by an in-situ steam generation process;
providing a nitride layer on the oxide layer; and
providing a second oxide layer on the nitride layer.

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